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STUDY PROJECT

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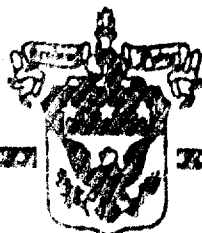
HAZARDOUS WASTE MANAGEMENT AT DEPARTMENT OF DEFENSE FACILITIES

BY

LIEUTENANT COLONEL EDWARD M. CHAMBERLAIN III, IN

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The paper provides an overview of environmental issues facing DOD officials. It is not designed to be prescriptive, but hopefully it will alert leaders to potential problems and convince them that responsible action by knowledgeable individuals is required to comply with environmental laws and to protect themselves from personal liability.

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HAZARDOUS WASTE MANAGEMENT AT DEPARTMENT OF DEFENSE FACILITIES

AN INDIVIDUAL STUDY PROJECT
Intended for Publication

by

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30 March 1990

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ABSTRACT

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The decade of the 1980's brought sweeping environmental changes across the United States. The environmental consciousness of the Nation was awakened and environmental protection and restoration became headline news. Big industry and the Department of Defense became major players in the new field. This paper examines some of the pertinent provisions of the major environmental laws affecting military installations. To further define the problem two case studies are presented. The first one deals with the Navy Ships Parts Control Center in Mechanicsburg, Pennsylvania. This study examines the problem in some detail and presents the historical aspects of the problem, the controversy between Federal and state legislation, the cost to the government to remediate an environmental problem, and the obligations assumed by military commanders for compliance with environmental standards, even if violations occurred prior to established and enforced standards. The second case study only looks at the case from the outcome aspect. During the Aberdeen proving Ground (APG) trial three civilian supervisors were found guilty of violation of environmental law. The APG case examination is conducted as an after action report from one of the civilian defendants. He briefly reviews some of the problems, the history of the environmental action and there he discusses the trial. The importance of this section is the clear demonstration that leaders are being held accountable for actions taken and not taken.

The paper provides an overview of environmental issues facing DOD officials. It is not designed to be prescriptive, but hopefully it will alert leaders to potential problems and convince them that responsible action by knowledgeable individuals is required to comply with environmental laws and to protect themselves from personal liability.

Hazardous Waste Management
at Department of Defense Facilities

Environmental concern is currently a high priority in the United States and for good reason. The magnitude of environmental pollution by industry and Federal agencies is almost overwhelming in terms of the percentage of the U.S. population directly affected by some type of health affecting pollution and the tremendous cost of restoring the environment to its natural, benign state. The specific problems military commanders and senior civilian leaders within the Department of Defense (DOD) face is the magnitude of pollution existing at DOD facilities, the cost of restoring the environment and the responsibilities leaders have to ensure compliance with the applicable regulations. The purpose of this paper is to focus the attention of Department of Defense leaders on the environmental problem through a brief review of some of the applicable Federal regulations and an examination of two sites, the Navy Ships Parts Control Center (SPCC) in Mechanicsburg, Pennsylvania and the trial at Aberdeen Proving Ground, Maryland. This paper will emphasize the interaction between Federal facilities and their state and local governments and communities and the tremendous cost of cleanup to the Services. This money must be taken from the defense budget and was originally intended for the training and readiness of U.S. military forces.

The seriousness and dimensions of the environmental problems were opened for the author via two primary events. One was the national attention generated by the prosecution and conviction of the three civilian managers at Aberdeen Proving Ground for violations of Federal environmental regulations. The other occurred directly as a result of service at Fort Ord, California, where significant time and money was expended to insure compliance with federal and state environmental regulations. The impact on Service budgets will be significant since the money for compliance comes directly from funds given to a commander to operate his installation. Under the provisions of the Compensation and Liability Act of 1980 (CERCLA or Superfund) a federal agency must adhere to all of the environmental requirements, but the Superfund cannot be used to finance the cleanup at a federal site.¹ The large budget reduction for Defense spending further exacerbates an already tough issue. Over the next two to five years for example, Fort Ord, California will spend several million, unprogrammed dollars to comply with environmental standards. That in itself raises several red flags; first, Fort Ord is not a high pollution producer. Second, California regulations are not a great deal more stringent than federal laws, but are strictly enforced. The conclusion to be drawn from this brief example is that all DOD facilities are potentially vulnerable. An installation that produces a large amount of pollutants and is located where environmental concern has not been a priority

potentially faces staggering costs to be able to comply with current environmental laws.

The Environmental Protection Agency (EPA) defines hazardous waste as substances exhibiting certain characteristics of ignitability, corrosivity, reactivity, or toxicity, or they are part of the over 400 to 500 substances listed by name that include common industrial waste, solvents and chemicals.² To further obscure the issue, different states class different materials as hazardous that are not listed by the EPA. This additional classification results in large discrepancies in reported amounts of hazardous waste.³

The lead document in establishing regulatory controls and standards for the environment was the National Environmental Policy Act of 1969, now with amendments. The originally stated purpose of the NEPA was, "To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality."⁴

Under these purposes, NEPA established procedural requirements for compliance. Briefly, these requirements required the establishment of a Council to be the regulatory

agency to review planned actions to analyze environmental consequences which might arise from those planned actions. This is the legislation establishing the requirements for environmental assessments and impact statements. Since the original NEPA concern, environmental awareness and knowledge have grown and have resulted in the proliferation of specific and detailed environmental laws.

The Resource Conservation and Recovery Act of 1976 (RCRA) is one of the primary regulations applicable to this review. This Act, particularly the 1984 amendments had significant impact throughout the country and were the basis for the litigation which occurred at Aberdeen Proving Ground (An example that will be reviewed later in this paper). This is the first regulation that dealt with ground disposal of hazardous waste, and a major provision of the law covers actions which occurred prior to 1976 which present "an imminent or substantial endangerment to health or to the environment."⁵ Another facet of the amendment makes provisions for clean up of pre-1976 contaminants even if they do not pose a health problem. This aspect of the law is what is so costly for organizations to comply with. The liability and responsibility for disposal of old material, even if the location has been sold, belongs to the original polluter. This was the situation with the much publicized Love Canal and Aberdeen Proving Ground cases.

The final Act having direct application to this work is the Comprehensive Environmental Response, Compensation and

Liability Act (CERCLA or Superfund). This Act was passed in December, 1980 and makes provisions for the Federal government to clean up toxic or hazardous wastes at closed or abandoned sites and, a key issue, to recoup the costs of clean up by suing those responsible for the contamination. This Act also requires the reporting of the release or spill of any hazardous material into the environment unless prior permission has been granted for the release. The superfund also provides funds for the clean up by establishing taxes for chemicals and hazardous waste, establishing penalties, setting limits of liability, and under the Superfund Amendments and Reauthorization Act (SARA), establishing mandatory cleanup and restoration schedules and standards.

Provisions in the Federal laws allow the states to establish their own laws and assist the federal government in monitoring environmental compliance. The specific challenges to comply with state and local regulations will be identified and discussed through the use of a case example, the Navy Ships Parts Control Center versus Pennsylvania. States with Federal programs have been delegated priority over the EPA to respond to and enforce Federal Law, this includes Federal and non-Federal facilities. The various responsibilities are negotiated then specified in memorandums of understanding between the Federal and state governments. Intergovernmental relations assume a key role both in the previous example and in the management and oversight by the EPA through regional

administrators. Though oversight criteria and authority is granted to the states, it is incumbent upon the states to develop clear and enforceable standards. This is another major point of contention in the case study of the Navy facility.

Environmental pollution is a significant concern to the U.S. in general but even more so to the DOD and its facilities. The May 1989 Gallup Poll showed 39 percent of the U.S. citizens surveyed favored increasing environmental spending, and 49 percent favored no decrease in spending. The EPA stated that Federal facilities should be the model for environmental compliance, but the general feeling among governmental officials is that DOD compliance has been slow.⁶ This slowness, combined with a general lack of emphasis by many in DOD and the tremendous amount of hazardous waste generated by DOD annually, has produced a problem of great magnitude and one requiring a tremendous expenditure of funds to correct. DOD records show that 530,000 tons of hazardous waste were generated during one year at DOD installations in the United States.⁷ The diversity of DOD activities ranges from "industrial-type manufacturing", through the multitude of activities required to support installations such as motor pools, health facilities, laundries and others. Over one third of all DOD installations in the United States generate hazardous waste. This waste is usually in the form of solvents, paints, fuel and oil, munitions, polychlorinated biphenyls (PCB), and

metals. One of the most significant aspects of the DOD pollution has been the contamination of groundwater with solvents and PCB's. The formidable task of cleaning up the many federal sites is complicated by two significant issues. Much work remains to identify the contaminated sites and determine the extent of contamination and the effort required for clean up. This links with the second problem, the cost of clean up. The large national debt coupled with many conflicting and competing priorities, complicated by an undefined requirement poses a real dilemma to Congress in their budgeting. Even though CERCLA has the 10.1 billion dollar Superfund for clean up, the Superfund cannot be used to clean federal sites.⁸ Funding for federal clean up must come directly from Congress or, as is often the case for smaller problems, must come from the current DOD budget. The following statistics are quoted to give the reader an appreciation for the dimension of the problem. During an EPA survey of facilities and handlers of hazardous waste for the facilities, it was found that almost half of 72 handlers were in violation of EPA regulations and 66 percent of the violations were considered serious. Time needed to correct violations was also lengthy. Nineteen facilities would require more than six months to complete their restoration, and some locations had been out of compliance for more than three years. During additional surveys of 14 installations in seven states, 12 were not in compliance with RCRA standards. Most of the violations resulted from

the Defense Logistic Agency's inability to dispose of the waste or to build adequate storage facilities in a timely manner. For the violations listed, 65 percent were considered by the EPA to be in the most serious category. In a December 1987 report DOD was assessed at having over 3500 potential sites located on 529 military installations. Most of the sites have now been assessed, but only about three percent have been cleaned up.⁹

The magnitude of the problem facing the United States and DOD has now been generally defined as well as some of the salient points in the management of hazardous waste and the applicable Federal regulations that impact heavily on environmental issues. This paper will now review the first case study, the problem experienced by the Navy Ships Parts Control Center (NSPCC) located in Mechanicsburg, Pennsylvania. The basic issue at the NSPCC is the existence of PCB's and some trace heavy metals in a storm water drainage ditch along the north side of the facility. The ditch empties into Silver Spring Run (a small stream) approximately one mile away from the base. Though this problem seems significant and indicative of poor environmental management by the Navy, there are several mitigating factors. The most salient of these is that there is no health risk nor threat of contamination of a water course at present. Additionally, the negative publicity that has been generated is based on facts discovered and

properly filed by the Navy during a proactive environmental survey.

Reacting to assessment requirements established by the 1976 Resource Conservation and Recovery Act and the 1984 amendments, the Navy contracted an independant firm to conduct an initial assessment study of the NSPCC. The purpose of the study was, "to conduct an initial assessment (IAS) to identify and assess sites posing a potential threat to human health or the environment due to contamination from past hazardous waste producing operations."¹⁰ Using a variety of techniques including records, aerial photography, and surveys, seven potential sites were identified. Four of the sites were recommended for further study; however, the assessment clearly stipulated that none of the sites posed an immediate threat to health or the environment. This report was filed through the Navy with copies also being sent to the EPA and the Pennsylvania Department of Environmental Resources (PADER). In 1988 the local media obtained a copy of the assessment and began an ongoing environmental campaign against the NSPCC. This case was originally set for adjudication in Federal court but was remanded back to the state. Currently negotiations are ongoing to determine state or Federal jurisdiction. The legal question centers around the ability of a state to regulate a Federal facility. This question is unresolved, but may prove to be a landmark decision in the enforcement of all laws, not only environmental ones if the state of

Pennsylvania is allowed to rule on the activities of a federal installation.

From the intergovernmental perspective there are four players, two major and two minor. The major players are the Federal environmental laws and a Federal facility aligned against the State of Pennsylvania and their environmental laws. The minor players are the EPA's regional office and Hampden Township. The EPA Regional office is monitoring the situation but is taking little direct action on the case. Hampden Township has a citizens toxic action committee (CTAC) which expressed initial concern. CTAC representatives attend the regularly scheduled technical review committee meetings (TRC) conducted by the NSPCC base commander. The CTAC is a well informed organization and they are satisfied that no immediate health or environmental threat exists. The committee is also satisfied that the Navy has taken corrective action to limit access to the contaminated area and to prevent further spread of the pollution. As further proof of the lack of concern neither CTAC nor Hampden Township have enacted any applicable environmental legislation that further restricts actions by the NSPCC.

Pennsylvania through PADER is concerned about the remediation of the drainage ditch and adjacent "contaminated" sites. This issue of remediations has generated all of the controversy between the Navy and Pennsylvania. Pennsylvania currently does not have any laws

in effect that are more restrictive than the RCRA laws even though allegedly changes are being drafted by the Pennsylvania legislature. A review of Purdon's Pennsylvania Statutes Annotated substantiates that Pennsylvania has not established environmental standards different than those set by the RCRA and CERCLA. Currently the alleged new standards don't exist. To further exacerbate the issue, Pennsylvania has legislated that Pennsylvania laws are not applicable to a party unless administrative or judicial enforcement action taken against that party under other applicable environmental laws have not been complied with.¹¹ The NSPCC has or is complying with all environmental laws and there has been no previous judicial action for the NSPCC to violate. PADER is currently demanding remediation of the drainage ditch of PCB's to a safe level that considerably exceeds the safety standard established by the EPA. This is the main issue in the decision for adjudication between the state and Federal court and this level of remediation forms the crux of the legal issue. The answer for this portion of the case study has not yet been decided.

It is not the objective of this example to detail the sampling, assessment, nor the remediation plan for the NSPCC; however, a general overview of past and ongoing actions will give the reader an appreciation for the command, management, and budgetary requirements which were generated at the NSPCC and are probably typical of requirements at all environmental clean up sites. The

original seven sites have grown to eleven sites. More than 500 soil samples have been taken just from the drainage ditch, there are now ground water monitoring wells, and both ground penetrating radar and excavation have been used to assess different sites on the base. Many of the sites are old and contain buried fuel tanks without current safeguards, old paint cans improperly disposed of, and old transformers from a previous repair site (this unfortunately was near the storm drain and is the source of the PCB's). The base commander established a technical review committee (TRC) that meets regularly to discuss the environmental issues, plot courses of action, and advise the commander. The result of the assessment indicates there is only one area that actually requires remediation, and that is the drainage ditch. The Navy developed eight courses of action to address the ditch; they range from taking no action at all to a multi-million dollar excavation and incineration of the spoil. Because of initial concern and a desire to cooperate, the NSPCC has already taken the action noted later thus surpassing the "no action" course. The NSPCC built a fence to prevent access to the ditch and they built a series of small dams in the ditch to reduce water velocity to allow the PCB and metal to settle out before it reached Silver Spring Run. Samplings up and down stream in Silver Spring Run confirm that there has been no contamination of the Run. Inclosure 1 shows table 8-1 through 10-5 giving cost estimates for the various methods to restore the ditch.

Note the most expensive course of action requires spending \$196.4 million. Inclosure 2 shows the money spent to date; a sizeable amount to be drawn from a rapidly dwindling defense budget. The NSFCC example has been used to graphically depict the high cost of environmental regulation adherence to all involved, to give an example of the magnitude of the remediation process even in cases where relatively minor pollution has occurred, and the command involvement and pro-active program necessary to adhere to Federal, state and, in some cases, local statutes.

The major lesson to be learned from this example is the tremendous demands across the full spectrum of involvement during a serious environmental action. It required fully dedicated personnel and a significant expenditure of money to remediate the problem. Hopefully this example has also provided insight into the variety of agencies and interest groups who are drawn into environmental cases. An implied lesson to be gleaned is the advantage gained by DOD installation leaders when they are knowledgeable and pro-active in the environmental arena. Further, a number of recommendations have been made in Congressional reports and testimony, in the restoration program developed by the Navy Ships Parts Control Center, and by Mr. William C. Dee, one of the managers and defendants in the Aberdeen Proving Ground case.

In the interest of brevity this paper will only detail the environmental problems at one DOD facility, the NSFCC;

however, there was a very significant trail conducted based on the violations of environmental laws at Aberdeen Proving Ground, Maryland. That trail has particular relevance to this paper and some of the findings from the trial have impact of DOD officials and will continue to do so. The rulings and findings from the trial are important because of the precedent established and the position of personal liability that commanders and managers are placed in. There were a number of actions taken that preceded the trial. One of the first major events was the conducting of a 15-6 investigation. This investigation revealed two significant facts. One was that there was very little knowledge or training in environmental laws and responsibilities being conducted prior to 1986 when the 15-6 was initiated. One other aspect which would prove to be key in this case and that could have serious future impact was the lack of command emphasis. Continuing along this chain of events leads the reader to the trial of Mr. William Dee and two others. As a result of this trial Mr. Dee prepared an after action type of presentation outlining some of the major problems in environmental compliance as well as some of the responsibilities leaders and the Army has.

The trial of Mr. Dee and the two other senior executives for four felony and one misdemeanor charges resulted in serious problems for the trio of DOD leaders. All three were convicted of some part of the allegations. It is noteworthy that during the trial certain matters could

not be used for defense. The defendants could not argue that environmental compliance was the responsibility of the Army; they could not present the inability of the post to respond to waste removal, nor could they plead ignorance of the law. Further directions were given to the judge and it was decided that the defendants did not need to have specifics on the RCRA, their knowledge was presumed, nor did they have to know what constituted hazardous waste, only that chemicals were involved. This case clearly establishes that individuals, not the Army, are liable in environmental cases, and this applies equally to all RCRA issues and importantly, the Army is an "easy target."¹⁴ The lessons learned by Mr. Dee from the experience include but are not limited to, "One must comply with absolute standards, present compliance is not sufficient, if attacked you are on your own, and lack of knowledge or lack of funds in no excuse."¹⁵ Continuing with Dee's analysis, he feels a number of actions are needed including amendments of the laws, establish an environmental quality office, (the installation) obtain legal counsel to ensure environmental compliance, establish a better working relationship between local, state, and Federal environmental offices (a recurring theme in various agency recommendations), conduct early assessment of potential problem areas, and ensure good community and media relations.

In summary then, commanders who have not yet conducted assessments of their facilities need to do so immediately.

The latest cost estimate presented to Congress to clean up DOD facilities exceeded \$14 billion. The costs are still being evaluated due to insufficient and untrained environmental staffs and the complexity of the problem.¹² Commanders need to be highly proactive in the environmental arena. DOD has a recent policy which establishes a goal of 1992 for the elimination of the disposal of untreated hazardous waste.¹³ A specific plan has not been developed but will probably consist of efforts to reduce generation of waste, plus recycling and treating the waste. Continuing the lesson appears clear to responsible DOD officials, military and civilian. Environmental awareness and responsibility is part of the way of life in the United States. It is not an insignificant issue that will pass if no emphasis nor attention is given to it. Clearly with environmental issues, as all issues, the commander is responsible - personally. A commander must plan and budget for an environmental program; he must be knowledgeable of his environmental responsibilities and he must ensure strict compliance with all applicable regulations. If an event occurs or is discovered which exceeds the installation ability to resolve, it must be elevated immediately to an action level. As teachers it is incumbent upon all military leaders to train the developing leaders to be environmentally conscious both to properly steward the defense dollars the nation provides and to protect an increasingly more fragile environment in the years to come.

2 Inclosures.

Appendix 1 to the Individual Study Project, "Hazardous Waste Management at DOD Facilities".

Initial Remediation Program Costs at the Navy Ships Parts
Control Center

IR Program Costs to Date (September 1989)

- Stormwater Drainage Swale	
Field Work Plans, Sampling & Analysis	\$1,042,286
Fence	\$82,147
3 Sediment Control Dams	<u>\$72,600</u>
	\$1,197,033
- On-base Sites	
Plans, radar survey, soil vapor survey	\$44,175
Removal Plan (Rad. Waste Disposal Area)	\$24,800
Upcoming Site Inspection Work	<u>\$1,039,962</u>
	\$1,108,937

PC-1791

Appendix 2 to the Individual Study Project, "Hazardous Waste Management at DOD Facilities".

Estimated Cost of Removal and Offsite Disposal of
Contaminated Material for the Navy Ships Parts Control
Center: Three Methods



TABLE 8-1 ESTIMATED COST OF REMOVAL AND OFFSITE LANDFILL DISPOSAL FOR
SEGMENT 1

Excavation and Hauling to Staging Area ^(a)	\$ 76,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Reloading Material at Stockpile Site	4,000
Transportation to Secure Landfill ^(a)	758,000
Disposal Fee ^(a)	<u>\$2,106,000</u>
Subtotal	\$3,056,000
Contingency	<u>\$1,069,000</u>
TOTAL	\$4,125,000

(a) Based on Contractor quotation.



TABLE 8-2 ESTIMATED COST OF REMOVAL AND OFFSITE INCINERATION FOR
SECTION 1

Excavation and Hauling to Staging Area ^(a)	\$ 253,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Screen/Rehandle/Drum Packing ^(a)	33,697,000
Transportation to Incinerator ^(a)	1,685,000
Incineration Fee, including Ash Disposal ^(a)	<u>11,541,000</u>
Subtotal	47,288,000
Contingency	<u>16,552,000</u>
Total	\$63,840,000

(a) Based on Contractor quotation.



TABLE 8-3 ESTIMATED COST OF REMOVAL AND ONSITE INCINERATION FOR
SEGMENT 1

Excavation and Hauling to Staging/Treatment Area ^(a)	\$ 253,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Rehandling and Incineration ^(a)	3,791,000
Onsite Ash Disposal ^(a)	101,000
Ash Disposal Capping	<u>24,000</u>
Subtotal	\$4,281,000
Contingency	<u>1,499,000</u>
Total	\$5,780,000

^(a) Based on Contractor estimate.



TABLE 8-4 ESTIMATED COST OF REMOVAL AND ONSITE TREATMENT WITH
THE K-PEG PROCESS FOR SEGMENT

Excavation and Hauling to Staging/Treatment Area ^(a)	\$ 253,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Treatability testing ^(a)	23,000
Pilot-scale study ^(a)	500,000
Mobilization/Demobilization ^(a)	632,000
K-PEG Treatment ^(a)	2,500,000
Placement of treated soil	<u>74,000</u>
Subtotal	\$4,094,000
Contingency	<u>1,431,000</u>
Total	\$5,525,000

(a) Based on Contractor quotation.

TABLE 8-5 ESTIMATED COST OF REMOVAL AND ONSITE VITRIFICATION FOR
SEGMENT 1

Excavation and Hauling to Staging/Treatment Area ^(a)	\$ 253,000
Excavation/Transportation of Treatment Trench Material	29,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Reload Contaminated Soil, Transportation to Treatment Trench	20,000
Treatability Testing ^(a)	45,000
Pre and Post Operational Technical Support ^(a)	75,000
Mobilization/Demobilization ^(a)	220,000
Vitrification ^(a)	2,300,000
Site Restoration	<u>10,000</u>
Subtotal	\$3,064,000
Contingency	<u>1,071,000</u>
Total	\$4,135,000

(a) Based on Contractor quotation.



TABLE 8-6 ESTIMATED COST OF IN-PLACE CONTAINMENT FOR SEGMENT 1

Mobilization/Demobilization	\$ 4,000
Ground Preparation Stone Application	21,000
Gunite Application ^(a)	612,000
Decontamination of Vehicles	<u>11,000</u>
Subtotal	\$645,000
Contingency	25,000
Total	\$870,000

(a) Based on Contractor quotation.



TABLE 9-1 ESTIMATED COST OF REMOVAL AND OFFSITE LANDFILL DISPOSAL
FOR SEGMENT 2

Clearing, Grubbing, Excavation, and Hauling to Staging Area ^(a) (including sink holes)	\$ 424,000
Construct Access Roadway	74,000
• Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
• Reloading Material at Transfer Site	7,000
Transportation to Secure Landfill ^(a)	1,271,000
Disposal Fee ^(a)	<u>3,531,000</u>
Subtotal	\$ 5,419,000
Contingency	<u>1,896,000</u>
Total	\$7,315,000

(a) Based on Contractor quotation.



TABLE 9-2 ESTIMATED COST OF REMOVAL AND OFFSITE INCINERATION FOR
SEGMENT 2

Clearing, Grubbing, Excavation, and Hauling to Staging Area (including sinkholes) ^(a)	\$ 424,000
Construct Access Roadway	74,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Screen/Rehandle/Drum Packing ^(a)	56,488,000
Transportation to Incinerator ^(a)	2,824,000
Incinerator Fee, including Ash Disposal ^(a)	<u>19,397,000</u>
Subtotal	\$ 79,319,000
Contingency	<u>27,761,000</u>
Total	107,080,000

^(a) Based on Contractor quotation.



TABLE 9-3 ESTIMATED COST OF REMOVAL AND ONSITE INCINERATION FOR
SEGMENT 2

Clearing, Grubbing, Excavation, and Hauling to Staging/Treatment Area (including sinkholes) ^(a)	\$ 424,000
Construct Access Roadway	74,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Rehandling and Incineration ^(a)	6,355,000
Onsite Ash Disposal ^(a)	169,000
Ash Disposal Capping	<u>38,000</u>
Subtotal	\$7,172,000
Contingency	<u>2,508,000</u>
Total	\$9,680,000

(a) Based on Contractor quotation.



TABLE 9-4 ESTIMATED COST OF REMOVAL AND ONSITE TREATMENT WITH THE
K-PEG PROCESS FOR SEGMENT 2

Clearing, Grubbing, Excavation, and Hauling to Staging/Treatment Area ^(a) (including sinkholes)	\$ 424,000
Construct Access Roadway	74,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Treatability Testing ^(a)	23,000
Pilot Scale Study ^(a)	500,000
Mobilization/Demobilization ^(a)	1,060,000
K-PEG Treatment ^(a)	4,200,000
Placement of Treated Soil	<u>125,000</u>
Subtotal	\$6,518,000
Contingency	<u>2,282,000</u>
Total	\$8,800,000

(a) Based on Contractor quotation.

TABLE 9-5 ESTIMATED COST OF REMOVAL AND ONSITE VITRIFICATION FOR
SEGMENT 2

Clearing, Grubbing, Excavation, and Hauling to Staging/Treatment Area ^(a) (including sinkholes)	\$ 424,000
Construct Access Roadway	74,000
Excavation/Transportation of Treatment Trench Material	49,000
Staging Area and Decon Pad Construction (including bermed stockpile area)	112,000
Reload Contaminated Soil, Transportation to Treatment Trench	33,000
Treatability Testing ^(a)	45,000
Pre and Post Operational Technical Support ^(a)	75,000
Mobilization/Demobilization ^(a)	220,000
Vitrification ^(a)	3,920,000
Site Restoration	<u>17,000</u>
Subtotal	\$4,969,000
Contingency	<u>1,741,000</u>
Total	\$6,710,000

(a) Based on Contractor quotation.



TABLE 9-6 ESTIMATED COST OF IN-PLACE CONTAINMENT FOR SEGMENT 2

Mobilization/Demobilization	\$ 4,000
Clearing and Grubbing ^(a)	9,000
Construct Access Roads	74,000
Construct Staging Area and Decontamination Facility	112,000
Excavate Sinkholes	67,000
Haul to Staging Area	48,000
Fill Sinkholes with Stone	140,000
Reloading Material at Staging Site	4,000
Haul Material to Secure Landfill ^(a)	770,000
Disposal Fee ^(a)	2,138,000
Gunite Trench Area ^(a)	<u>418,000</u>
Subtotal	\$3,780,000
Contingency	<u>1,325,000</u>
Total	\$5,105,000

(a) Based on Contractor quotation.



TABLE 10-1 ESTIMATED COST OF REMOVAL AND OFFSITE LANDFILL DISPOSAL
FOR SEGMENT 3

Clearing, Grubbing, Excavation, and Hauling to Staging Area ^(a)	\$ 101,000
Construct Access Roadway (through Segments 2 and 3)	89,000
Two Staging Areas and Construction of Two Decon Pads (including bermed stockpile area)	207,000
Reloading Material at Transfer Site	2,000
Transportation to Secure Landfill ^(a)	302,000
Disposal Fee ^(a)	<u>840,000</u>
Subtotal	\$1,541,000
Contingency	<u>539,000</u>
Total	\$2,080,000

^(a) Based on Contractor quotation.

TABLE 10-2 ESTIMATED COST OF REMOVAL AND OFFSITE INCINERATION FOR
SEGMENT 3

Clearing, Grubbing, Excavation, and Hauling to Staging Area ^(a)	\$ 101,000
Two Staging Areas and Construction of Two Decon Pads (including one bermed stockpile area)	207,000
Screen/Rehandle/Drum Packing ^(a)	13,440,000
Transportation to Incinerator ^(a)	672,000
Incineration Fee, including Ash Disposal ^(a)	<u>4,603,000</u>
Subtotal	\$19,023,000
Contingency	<u>6,657,000</u>
Total	\$25,680,000

^(a) Based on Contractor quotation.



TABLE 10-3 ESTIMATED COST OF REMOVAL AND ONSITE INCINERATION FOR
SEGMENT 3

Clearing, Grubbing, Excavation, and Hauling to Staging/Treatment Area ^(a)	\$ 101,000
Two Staging Areas and Construction of Two Decon Pads (including one bermed stockpile area)	207,000
Rehandling and Incineration ^(a)	1,512,000
Onsite Ash Disposal ^(a)	40,000
Ash Disposal Capping	<u>8,000</u>
Subtotal	\$1,868,000
Contingency	<u>652,000</u>
Total	\$2,520,000

(a) Based on Contractor quotation.



TABLE 10-4 ESTIMATED COST OF REMOVAL AND ONSITE TREATMENT WITH THE
K-PEG PROCESS FOR SEGMENT 3

Clearing, Grubbing, Excavation, and Hauling to Staging/Treatment Area ^(a)	\$ 101,000
Two Staging Areas and Construction of Two Decon Pads (including one bermed stockpile area)	207,000
Construct Access Roadway (through Segments 2 & 3)	89,000
Treatability Testing ^(a)	23,000
Pilot Scale Study ^(a)	500,000
Mobilization/Demobilization ^(a)	252,000
K-PEG Treatment ^(a)	1,000,000
Placement of Treated Soil	<u>33,000</u>
Subtotal	\$2,205,000
Contingency	<u>775,000</u>
Total	\$2,980,000

(a) Based on Contractor quotation.



TABLE 10-5 ESTIMATED COST OF REMOVAL AND ONSITE VITRIFICATION FOR
SEGMENT 3

Clearing, Grubbing, Excavation, and Hauling to Staging/ Treatment Area ^(a)	\$ 101,000
Excavation/Transportation of Treatment Trench Material	13,000
Two Staging Areas and Construction of Two Decon Pads (including one bermed stockpile area)	207,000
Reload Contaminated Soil, Transportation to Treatment Trench	8,000
Construct Access Roadway	89,000
Treatability Testing ^(a)	45,000
Pre and Post Operational Technical Support ^(a)	75,000
Mobilization/Demobilization ^(a)	220,000
Vitrification ^(a)	996,000
Site Restoration	4,000
Subtotal	\$1,758,000
Contingency	617,000
Total	\$2,375,000

(a) Based on Contractor quotation.

ENDNOTES

1. Dexter J. Peach. "Hazardous Waste Management at Federal Facilities." Testimony before House of Representatives, 10 March 1985, p. 4.
2. Congressional Budget Office Study, "Hazardous Waste Management: Recent Changes and Policy Alternatives," May 1985, p. 9.
3. Ibid. p. 10.
4. Public Law 91-190. "The National Environmental Policy Act of 1969," p. 1.
5. EPA. "Federal Facilities Compliance Strategy" (EPA "Yellow Book"), Washington, D.C., 8 Nov 1988, appendix A. p. 10.
6. Dexter J. Peach, "Hazardous Waste Management at Federal Facilities," Testimony before House of Representatives, 10 March, 1988, pgs. 1, 7, and 13.
7. General Accounting Office Report to Congress, "Hazardous Waste. DOD's Efforts to Improve Management of Generation, Storage, and Disposal," May 1986, p. 10.
8. Dexter J. Peach. "Hazardous Waste Management at Federal Facilities." Testimony before House of Representatives, 10 March 1985, p. 4.
9. Ibid. p. 9.
10. Fred C. Hart Associates, Inc., "Initial Assessment Study of Navy Ships Parts Control Center Mechanicsburg, Pennsylvania," New York, N.Y., April 1985, p. 1.
11. Purdon's Pennsylvania Statutes Annotated," Title 35 Health and Safety, 1501 to End," Pennsylvania Biesel Company, chapter 13, p. 110.
12. Dexter J. Peach, "Hazardous Waste Management at Federal Facilities," Testimony before House of Representatives, 10 March 1985, p. 1.
13. General Accounting Office report to Congress, "Hazardous Waste, DOD's Efforts to Improve Management of Generation, Storage, and Disposal," May 1986, p. 62.
14. William C. Dee. "briefing charts sent to Mr. Peter Lagione, Chambersburg, PA," number 19.
15. Ibid. number 20.